target 16 of W, TiW or Sn, a wafer holder 20 equipped with a heater 22, a wafer lift mechanism 24, a wafer port 28, a pumping port 32, a clamp ring 30 and a chamber shield 34. A DC power supply 25 is connected to a target 21 and a conductive part of the chamber, such as the chamber wall 18 or chamber shield 34, thereby establishing a voltage potential between the grounded chamber wall 18 and the target 21. A DC bias circuit 23 is connected to the clamping ring and thus applies a DC bias to the wafer (not shown). The hood 36 of the clamp ring 30 protects the tip 38 from being coated by the sputtered particles. A perspective view of the same sputter chamber 10 is shown in Figure 2.

007 As shown in Figure 1, the chamber shield 34 is another important component in the sputter chamber 10. It forms a seal between the clamp ring 30 and the chamber body 12 such that sputtered particles from the sputter target 16 do not contaminate the chamber wall 18 during a sputtering process. It should be noted that, during the sputtering process, the wafer pedestal 20 is in a raised position with the tip portion 38 of the clamp ring 30 touching the heater 22 on the pedestal 20. In order to achieve a tight seal from the chamber wall 18, a small gap 40 is normally maintained between the clamp ring 30 and the chamber shield 34. In

a typical metal sputtering process where a W, TiW, Sn or other metal is used in the sputter chamber, the emission of sputtered particles of the metals is shaped with a forward cosine distribution such that a more desirable deposition process in which metal particles are deposited uniformly at the center and the edge of the wafer can be achieved.

008 One of the processing difficulties incurred in a sputtering chamber is the placement of the wafer on the wafer pedestal. When a wafer is not positioned at a perfectly centered position on a wafer pedestal, i.e., the wafer position has shifted away from the center, subsequent metal deposition process produces a wafer that has thinner coating on one edge which will then lead to defocusing during photolithography resulting in defective dies being produced on the wafer edge. The defective dies result in a low yield of the physical vapor deposition process. It is therefore an important task during the fabrication process to center a wafer on a wafer pedestal properly before a deposition is to take place.

009 It is therefore an object of the present invention to provide an apparatus for self-centering a wafer on a wafer pedestal that does not have the drawbacks or shortcomings of the conventional apparatus.

010 It is another object of the present invention to provide an apparatus for self-centering a wafer on a wafer pedestal situated in a physical vapor deposition chamber that does not require any additional processing step.

011 It is a further object of the present invention to provide an apparatus for self-centering a wafer on a wafer pedestal in a sputtering chamber by using a modified wafer lifter equipped with at least four support fingers.

012 It is another further object of the present invention to provide a wafer lifter for self-centering a wafer on a pedestal by providing four support fingers on a lifter body that are each equipped with a slanted surface for contacting the wafer and for performing the self-centering function.